

WHAT IS CLAIMED IS:

1. A method for selecting frame encoding parameters to improve
5 transmission performance for a transmitting frame being
transmitted from a transmitting station to a receiving station
over a transmission medium of a frame-based communications
network, the transmitting frame having a header segment and a
payload segment, the header segment being transmitted using a
10 fixed set of encoding parameters such that the header segment can
be received and decoded by all stations on the network, the
payload segment being transmitted using a variable set of payload
encoding parameters, the transmitting station sending the
transmitting frame using one set of the variable set of payload
15 encoding parameters at a time, comprising the receiving station:
receiving and decoding the header and payload segments of
each transmitting frame, the decoding including computing frame
statistics;
selecting a plurality of sets from the variable set of
20 payload encoding parameters to form a possible set of payload
encoding parameters;
for each set of payload encoding parameters in the possible
set of payload encoding parameters, generating, based upon the
frame statistics, an estimate of network performance
25 characteristics expected if the transmitting station were to
transmit the transmitting frame using that set of payload
encoding parameters;
selecting, based upon the estimates of expected network
performance for each set of payload encoding parameters in the
30 possible set of payload encoding parameters, a set of payload
encoding parameters having optimized network performance
characteristics.

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2. The method of Claim 1, wherein the frame statistics include
a slicer sum of squared error for the header segment and a slicer
5 sum of squared error for the payload segment.

3. The method of Claim 1, wherein the frame statistics include
error indicators for the header segment and the payload segment.

10 4. The method of Claim 1, wherein the frame statistics include
an indication of the one set of the variable set of payload
encoding parameters used.

15 5. The method of Claim 1, wherein the expected network
performance characteristic estimates include an estimate of
system throughput and an estimate of packet error rate.

20 6. The method of Claim 1, wherein generating an estimate
includes calculating a weighted average of the frame statistics
for a predetermined number of received frames.

25 7. The method of Claim 6, wherein calculating a weighted
average includes applying a weighting function based upon number
of symbols in a received frame, order of frame reception, and
time of frame reception.

8. The method of Claim 1, wherein:
the expected network performance characteristic estimate
includes a product of symbol rate and bits per symbol, and
30 the optimized network performance characteristic estimate
includes a maximum product of symbol rate and bits per symbol and
an estimated packet error rate at or below a predetermined packet
error rate.

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9. The method of Claim 8, wherein the estimated packet error rate is generated by:

5 computing a mean square error estimate as a weighted average of a slicer sum of squared error for the header segment and a slicer sum of squared error for the payload segment;

rescaling the mean squared error for a symbol rate of interest

10 to provide a rescaled error; and

comparing the rescaled error to a threshold for a symbol constellation of interest.

10. The method of claim 9, wherein the threshold is weighted by
15 results of previous threshold comparisons.

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